

FEATURES



Brain Drain Revisited

The Economic Impact of Immigration

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As the growth of protests directed at the Group of 20 has shown, world economies are becoming increasingly globalized in ways that create both opportunities and anxieties. Globalization manifests itself in many sectors of the economy, including increased trade in products, services, and ideas, the movement of factors of production such as capital and labor, and the movement of productive activities across international borders. One of the most closely watched of these patterns is the migration of highly-educated people across international borders, most commonly from relatively poor source countries towards relatively wealthy receiving countries. That migration is seen as an opportunity for the migrants themselves, but migration is viewed with more ambivalence by both the governments and residents of the source and receiving countries. This article examines patterns of recent emigration of the highly-educated from developing countries—the “brain drain”—and places that migration in the context of economic and policy analysis.

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Brain Drain Today

The modern era of mass migration to the wealthy countries of the Organisation for Economic Co-operation and Development (OECD) is probably best dated to the 1960s when the United States ended 40 years of restrictive immigration policy and began admitting many more immigrants from a much wider range of countries. In recent years, the United States has admitted an average of about one million immigrants per year, with immigrants from Asia and Latin America accounting for about 80 percent of that total. While Canada and Australia have been primary

The views expressed in this paper are the author's and are not necessarily representative of the CBO's.

destinations for international immigrants for decades and immigration from poor countries to Europe has increased substantially in the past three decades, the United States continues to play an important role in worldwide migration because of the many immigrants it accepts and because of the large number of countries that send emigrants to the United States. US immigration policy prioritizes family reunification, but it has also included preferences for immigrants with specialized skills, through the modern H1-B program, for example. Other countries, particularly Australia and Canada, have been more aggressive in their effort to recruit and their policies have led them to admit disproportionate numbers of highly skilled immigrants.

The large flows of skilled immigration to Australia and Canada have been facilitated by both countries' use of a point system that makes prospective immigrants' admission easier if they possess specialized technical skills that are viewed as in short supply. Australia, for example, considers a prospective immigrant's age, level of schooling, work experience, English language ability, and occupational background in its skilled immigrant program. Doctors, engineers, mechanics, and carpenters are among the occupations viewed favorably in the Australian immigration process. One example of these policies' effects is that Vancouver, Canada was the destination for many highly-skilled immigrants from Hong Kong in the years leading up to the 1997 change of Hong Kong from British to Chinese sovereignty. Some European countries, such as Germany, are increasing their use of education and skill as criteria in their immigration admission policies. Thus, the policies of receiving countries facilitate the emigration of highly-educated, highly-skilled workers from developing countries, though the United States pursues that strategy

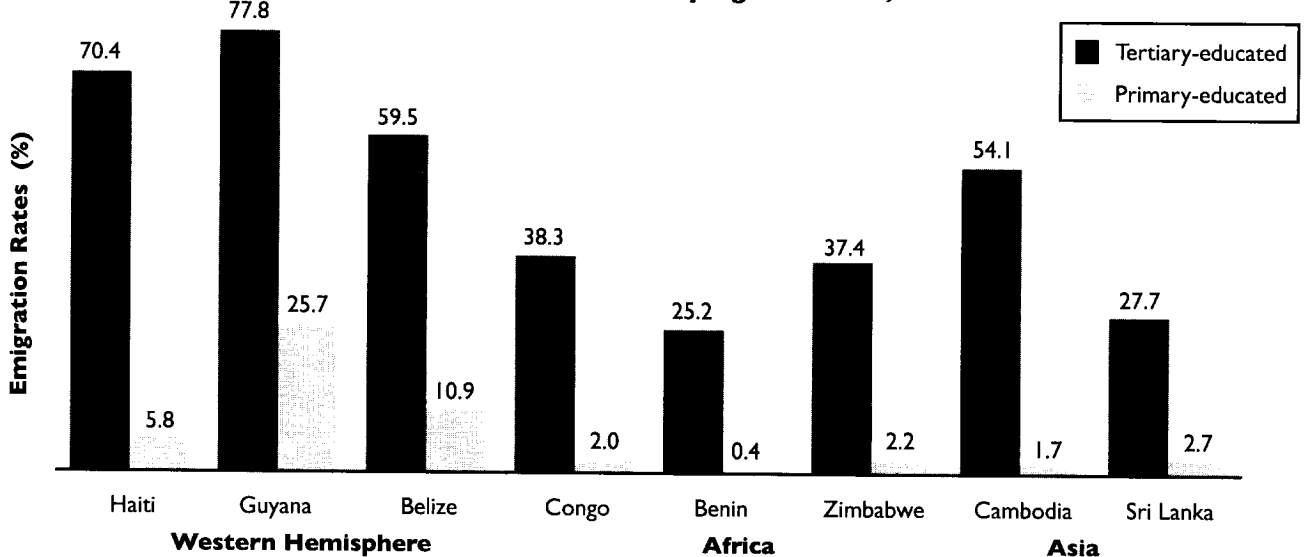
less vigorously than do many other receiving countries.

The policies of receiving countries, along with the greater intrinsic mobility of educated workers, have led immigrants to be disproportionately drawn from the most skilled workers of the developing countries. One way to see this is to consider the emigration rates of various education groups—where the rate is defined as the fraction of the population born in a particular country (e.g. Mexico) with a given schooling level (e.g. tertiary) that have emigrated to other countries. The OECD has recently calculated that, as of 2000, roughly two-thirds of college-educated natives of Trinidad and Tobago have emigrated, primarily to Great Britain and to the United States. In contrast, only 10 percent of native Trinidadians with primary educations have emigrated to other countries. Thus, emigration from Trinidad and Tobago is highly selective, with emigration much more likely among the highly-educated. That pattern holds for many of the smaller countries of the Western Hemisphere, such as Haiti (70.4 percent emigration rate amongst the college-educated, 5.8 percent amongst those with primary schooling), Guyana (77.8 percent versus 25.7 percent), and Belize (59.5 percent vs. 10.9 percent). The high emigration rates for these smaller American countries is in part driven by US immigration policy that places the same fixed immigration cap (20,000 per year) on all countries, regardless of size. Those caps often have no effect on the immigrants from small countries, where the caps do not bind, but they do restrict immigration from large countries such as Mexico and China.

The American countries cited above are extreme, but there are many other countries where emigration rates are simultaneously high and tilted towards the highly-educated. Examples of high and tilted emigration rates

Who's Leaving: Examples of High Brain Drain

Emigration Rates by Country of Origin and Education Level, for Selected Developing Countries, 2000



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 DIOG-E 2000; Barro and Lee, 2010; Lutz et al., 2010

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in Africa include Congo (38.3 percent vs. 2.0 percent), Benin (25.2 percent vs. 0.4 percent) and Zimbabwe (37.4 percent vs. 2.2 percent), and examples of this pattern in Asia include Cambodia (54.1 percent vs. 1.7 percent) and Sri Lanka (28.8 percent vs. 2.7 percent). In contrast, there are very few countries with substantial emigration rates where the emigration is tilted in the opposite direction, i.e., where it is the least educated who emigrate with the highest frequency. Two countries that do display such a pattern, according to the OECD, are Uzbekistan (13 percent for the college-educated and 30 percent for those with primary schooling) and Kazakhstan (28.8 percent for the college-educated and 41.5 percent for those with primary schooling). The reasons behind these departures from

intangible capital such as organizations and knowledge. In the simplest model, migration of skilled labor from a low-income country such as Mexico to a high-income country such as the United States will increase their skilled labor and decrease skilled labor in Mexico. Since labor demand curves slope downward, those changes will increase skilled labor wages in Mexico and decrease them in the United States. The effects on the two other factors, capital and unskilled labor, are more difficult to predict. Studies have generally concluded that skilled labor is complementary to the other factors, which is to say that more skilled labor raises the wages and returns paid to unskilled labor and capital, respectively. So, in this simplest framework, migration of skilled labor helps capital and low-skilled

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the more commonly-observed brain drain phenomenon have not been studied directly, but each of these countries has large flows of undocumented emigrants, a form of migration that may be disproportionately appealing to less-educated workers.

The emigration of the educated greatly alters the relative number of educated workers in some (though not all) countries of origin, but the effects on receiving countries are less pronounced. In the United States, for example, the average education of immigrants is roughly equal to that of natives, though immigrants are more likely to be in both the low and the high ends of that distribution. The same appears to be true for other major receiving countries as well, though Canada and Australia may receive fewer low-skilled immigrants than does the United States or European receiving countries such as France, Great Britain and Germany. The disparate effects of immigration on the educational levels of receiving and sending countries are driven by the different average schooling levels of the two types of countries. The prototypical immigrant is highly-educated relative to the natives in their home country but then moves to a country where, due to the higher education level, they are close to the average.

Economic Models of the Brain Drain

Economic models help us understand how the immigration of highly-educated workers might be expected to affect conditions in both sending and receiving countries. To keep things simple, consider a world in which there are only three economic factors – skilled labor, unskilled labor and capital. By “capital,” economists mean physical capital such as factories, land, farm equipment, and

labor in the receiving country and helps skilled labor in the sending country. In contrast, the brain drain harms skilled labor in the receiving country and harms capital and low-skilled labor in the sending country.

There are several economic mechanisms, however, that may serve to partially undo the wage effects highlighted in the simple analysis outlined above. First, migration of skilled labor may induce cross-country migration of unskilled labor or, more importantly, capital. If both of those factors follow the initial brain drain, then the effects of the migration of skilled labor on wages and capital returns will be mitigated. In the extreme case where all three factors move in equal proportions, there may be no effect on wages in either country. Of course, however, there are limits to international mobility for labor and capital, particularly for labor, and so this effect surely does not cancel out the more conventional effects outlined above. Furthermore, land, a form of capital, is of course completely immobile. Second, changes in the composition of economic activity can undo some of the direct wage effects of a brain drain. In particular, economic activity that is skilled-labor-intensive may relocate to the country with the newly-increased share of skilled workers.

For example, multinational corporations’ research and development activities might relocate to the country receiving a brain drain, thereby pushing wages of skilled labor in the receiving country back towards their higher, pre-brain drain level. (The growth of call centers in developing countries such as India is an example of productive activity relocating to locales where the necessary productive inputs are relatively inexpensive.) If these countervailing forces are sufficiently strong, then the



relative migration of educated labor may not much change the relative wages of skilled or unskilled labor in either the sending or receiving country.

Those benign views of the brain drain notwithstanding, there have been substantial concerns by economists and others that the brain drain might leave some people disadvantaged. It must be noted at the outset that, with few exceptions, the disadvantaged do not include the migrants themselves. Economic theory is very clear that immigrants expect to be better off with the move. There are of course uncertainties associated with anything as adventurous as immigration, and so many immigrants turn out to be worse off and many of them actually return to their home country or emigrate to a second receiving country. But it would be odd for people to move if they *expect* to be worse off as a result of the move so, on average, immigrants must be better off. And it's no wonder that they are, as earnings, income, wealth, and a host of other social welfare measures indicate that life is easier and better, on average, in the receiving than in the sending countries. Indeed, if one takes such measures seriously, the question arises of whether virtually all residents of current sending countries would emigrate if developed countries did not restrict immigration.

Another group that is pretty clearly not harmed by emigration is the sending country residents who economically resemble the emigrants. Immigrants from Mexico to the United States, one of the largest trans-national migrations in recent decades, have largely been drawn from the lower middle-class of Mexico—those with some secondary schooling—and not so much from the most educated or from the very poorest. The OECD estimates that, in 2000, roughly 15 percent of the Mexican-born with secondary schooling had emigrated, primarily to the United States. (Mexico is unusual in that its large-scale emigration is not a brain drain.) The Mexicans with secondary schooling that remained behind largely benefited from that emigration in that their skills were more scarce and hence able to draw a higher price. For countries such as Benin for which there has been a real brain drain, i.e., large-scale emigration tilted towards the most educated, the highly-educated that have remained also saw an increase in their wages and earnings.

A final group that is likely helped by the brain drain is the less-educated natives of the receiving countries. That group benefits through several different mechanisms. First, the relatively high incomes earned by highly-educated immigrants lead to

greater tax revenue and less pressure on government to raise taxes on lower-income natives. Second, the labor of less-educated natives may be complementary to the labor of the highly-educated, which is an economist's way of saying that the productivity of less-educated natives is higher when there are more educated workers in the economy to work with them. One example of this sort of complementarity would be when immigrant entrepreneurs start companies that ultimately employ many less-educated natives. Third, the presence of highly-skilled immigrants may reduce the price that less-skilled natives have to pay for certain goods and services, particularly professional services. A leading example of this sort of benefit would be immigrant doctor's provision of medical services to underserved rural and inner-city communities. Without those immigrant doctors, many American communities would have far more expensive medical care, or perhaps no medical care at all.

There are two groups, however, for whom there has been more legitimate concern about the effects of the brain drain. The first group is the highly-educated natives in the receiving countries whose earnings may be depressed due to the increase in the supply of the type of labor that they provide. To take a concrete example, the migration of large numbers of mathematicians from the former Soviet Union to the United States in the years following 1990 lowered the earnings of native US mathematicians. Similarly, while immigrant doctors provide benefits to consumers of all income levels, they probably depress the earnings of native-born physicians relative to what they would have been absent immigration. Those competitive effects may be attenuated, however, to the extent that, among the highly-educated, immigrants and natives tend to do somewhat different things and are therefore not, in



An undocumented student receives a Masters degree at UCLA. Highly educated immigrants relieve pressure on the government to raise taxes, due to their relatively high incomes.

the language of economics, perfect substitutes. Consider, as another example, the immigration of computer programmers whose mathematical and programming skills are first-rate but whose English language skills are not. Some fraction of native-born workers with programming skills will, in response to this immigration, move into closely related management and sales fields where they have an advantage relative to the immigrants. If natives can readily reposition their careers in response to immigration, particularly into closely-related positions that are now in greater demand, immigration may actually increase the earnings of similarly, but not identically-skilled natives.

The other group that may be harmed by the brain drain are the less-skilled workers that remain in the sending country, and there are two reasons behind this. First, as in the receiving countries, less-educated workers may be complementary to the more educated, which means that a reduction in the latter leads to lower productivity among the former. For example, less-educated manufacturing workers may find themselves less in demand if

migrants, but they can also choose to further focus their selection policies to admit immigrants with scientific and technical skills, a policy has been advocated in the United States by many observers, most prominently by Bill Gates, founder of Microsoft. But the United States can also choose to continue its traditional focus on family reunification, in which the relatives of current citizens are given preferences regardless of their occupational skills. That policy, too, has its advocates in many receiving countries, primarily within the community of current immigrants whose family members would be allowed to immigrate.

The discussion here has shown that these policy choices offer both opportunities and pitfalls. Increased admission of highly technical, highly-educated immigrants to receiving countries has the potential to advance those countries' creation of new ideas, new products, and new business ventures. Those immigrants would also benefit many workers and consumers in receiving countries, either by making the labor of less-skilled, less-educated workers more valuable, or by providing goods and professional

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there are fewer people around to manage the plants and to arrange exports to developed countries. Second, there may be broad-ranging benefits to the presence of educated workers in a poor country that are not completely captured in the wages or earnings of the educated workers themselves. Economists refer to these benefits as positive externalities (as opposed to negative externalities, such as pollution). Education may confer external benefits because educated workers create ideas and opportunities for others, or because the participation of the highly-educated in government, politics and business lead to a more efficiently-organized economy. While there is considerable uncertainty about the effect of those externalities, they are taken as a given in much of American policy towards schooling and immigration. In particular, the US government has long subsidized the education of foreign nationals at American colleges and universities with the explicit expectation that those students will return to work in their home countries. Part of the logic behind that policy was to improve economic conditions for the students' home country.

Economic Effects of a Larger Brain Drain

While the immigration of undocumented workers continues to be both politically and demographically important, countries do have a great deal of control over the number and type of immigrants they admit. Receiving countries can of course choose to admit more or fewer im-

services—such as medicine—at a lower prices than would be otherwise be available. But there are also some people in receiving countries that would lose out from such a policy, particularly those skilled workers whose earnings would be lowered or whose businesses would be displaced by the arrival of more educated immigrants.

Admittance of more skilled immigrants by receiving countries would also affect the sending countries from which those immigrants come. The most direct effects would be to reduce labor market opportunities of the less-skilled, less-educated workers in those sending countries, as the highly-educated emigrants would not be around to start or manage businesses, to staff governmental offices, or to provide professional services. There may be additional systemic effects, whereby the economic organization of the sending countries is harmed by the exodus of its most skilled citizens, though those effects are hard to measure.

Taking the world as a whole, economic analysis finds that there are generally positive effects from integrating markets through trade and migration, and increasing the brain drain through easier admission of educated immigrants to developed countries fits well within that framework. In addition, there may be collective benefits from moving any workers from countries with poorly functioning economies towards wealthier countries. But, as this discussion has highlighted, there will always be a subset of individuals who are made worse off by a larger brain drain. ■